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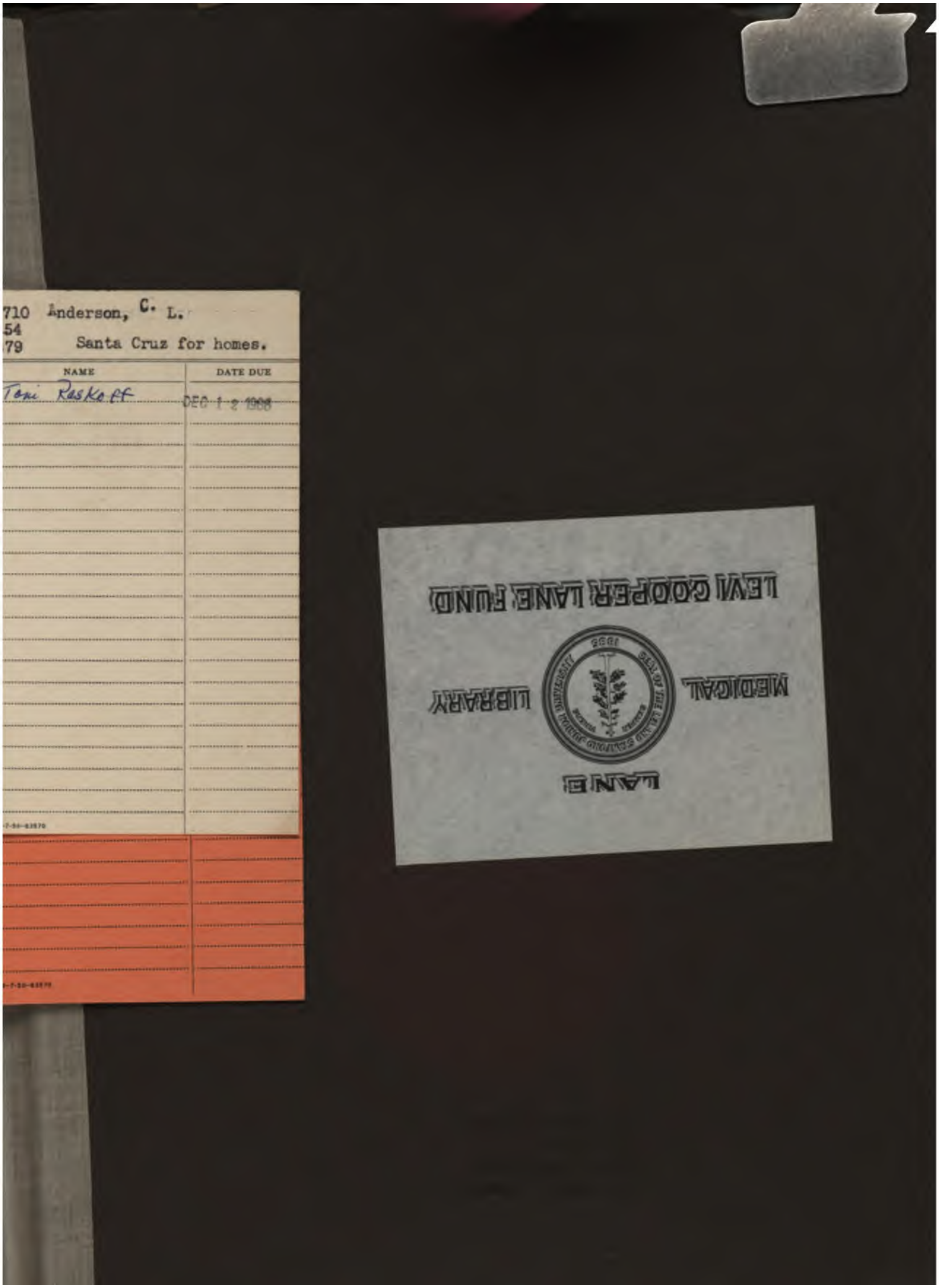
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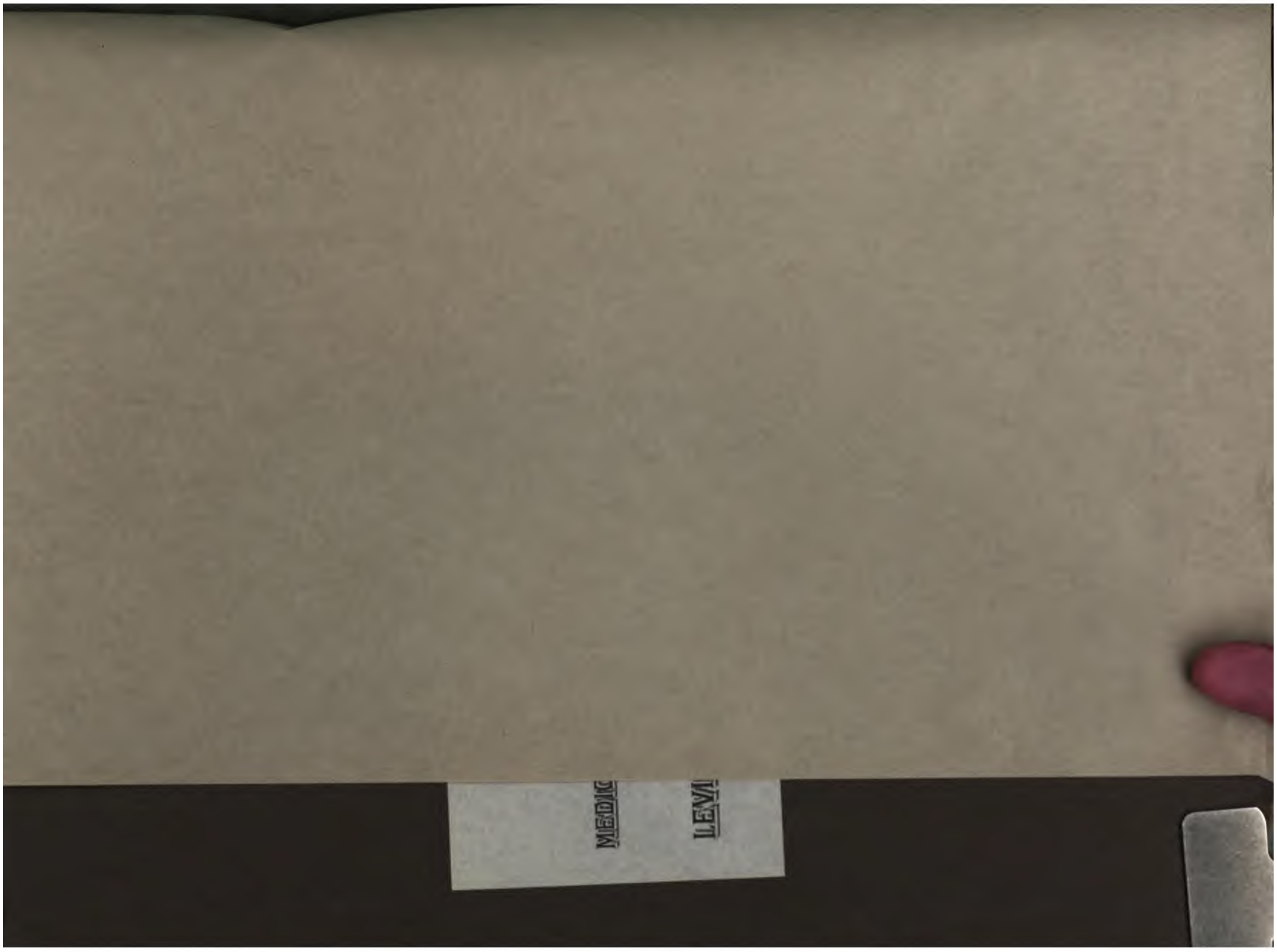
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SANTA CRUZ FOR HOMES.

THE

CLIMATE, BOTANY, GEOLOGY

AND HEALTH

OF SANTA CRUZ AND VICINITY.

BY C. L. ANDERSON, M. D.

San Francisco, 106 Leidesdorff Street:
WALLACE W. ELLIOTT & CO., PUBLISHERS.
1879.

1879

MAP
TO ILLUSTRATE
Wind Currents OF THE PACIFIC COAST.
COMPILED BY
C.L. ANDERSON, M.D.
OF
SANTA CRUZ, CAL.
FOR
ELLIOTT & COS. ILLUSTRATED HISTORY.

57°00' SITKA
VANCOUVERS I.
JAPAN CURRENT
51°29' TEILAGOOM
46°11' ASTORIA Columbia Riv
40°46' HUMBOLDT BAY EUREKA
CAPE MENDOCINO
38°03' BENICIA SACRAMENTO
37°48' SAN FRANCISCO
San Joaquin Val.
37° SANTA CRUZ
BAY OF MONTEREY
WATSONVILLE
36°36' North Latitude. MONTEREY
SALINAS
34°31' SANTA BARBARA
DESERT WINDS
34°10' LOS ANGELES
SANTA MONICA
WILMINGTON
32°42' SAN DIEGO
NORTH EQUATORIAL CURRENT
135°20' 122°27' 119°36' 117°43' 117°14'

IDEAL SECTION OF SANTA CRUZ MOUNTAINS.
PREPARED BY
C.L. ANDERSON, M.D.

1. *Soil and Alluvium.*
2. *Conglomerate.*
3. *Shale.*
4. *Sandstone.*
5. *Limestone.*
6. *Metamorphic.*
7. *Granite.*

4000 FT.
MT SACHE. 3780 FT.
2000 FT.
2000 FT.
1000 FT.
BAY OF MONTEREY
1 2 3 4 5 6 7

CLIMATE, BOTANY, GEOLOGY AND HEALTH OF SANTA CRUZ AND VICINITY.

BY C. L. ANDERSON, M. D.

I propose to speak of Santa Cruz and adjacent region as a place for *Homes*.

And in doing so it will be necessary to discuss somewhat particularly the physical conditions of this region, including its Geology, Botany, and Climate, in their relations to health and homes. For without health and comfort of body, of what good to us are all the beauties and resources of nature—all the allurements of art? We have no eyes for glowing scenes of earth and sky, no ears for concord of sounds.

It must be true, therefore, that the physical conditions which contribute most toward a healthful body, and spread before us an esthetic outlook to nourish and invigorate the mind, must be the most desirable place for a permanent home.

It is also true that a large part of the human race are seeking a country where they may find the blessings of health and a genial climate, with such natural surroundings as may give variety to some simple, it may be, but beautiful home.

It is possible such a place might be found on some of the southern islands of the Pacific—Tahiti or the Fijis—but these are not so easily reached, and many of the qualities that enter into the idea of home are wanting there.

HOW SANTA CRUZ COUNTY IS SITUATED.

Santa Cruz is near the line of the 37th degree of North latitude. It looks out toward the south on the Bay of Monterey and the Pacific Ocean. Panama steamers may be seen in the southwest; Monterey, the ancient capital of California, at times may be dimly outlined, 26 miles across the bay, a little east of south; Santa Lucia range of mountains looms up as a background to the height of three or four thousand feet, beyond Monterey. The Gavilan Mountains stand in bold relief in the south-east, guarding as it were the entrance of the Salinas River into the Bay of Monterey. Looking towards the east, through and beyond the valley of the Pajaro, some 60 miles, may be seen Pacheco Peak, and other peaks in the Monte Diablo range. Northeast, and 20 miles distant, stands Mount Bache, ("Loma Prieta,") the highest point in the Santa Cruz Mountains. The northern region contains the valleys of the Aptos, Soquel and Zyante Creeks and San Lorenzo River. These valleys are narrow, (cañons in places) winding, and with their tributaries are densely timbered; whilst the mountain sides, often to their summits, are clothed with a dense flora of trees, shrubs, and smaller plants. This verdure, much of it evergreen, gives to the seaward slope of these mountains a dark green appearance, as we look at it from the bay or ocean.

And a person coming by ship from the south, after seeing only barren, smooth mountains, with but occasionally a spot of timber, along the southern coast, would at once conclude that here on the Bay of Monterey is a sheltered, well watered and fertile region. And so it is.

WIND CURRENTS.

The winds that blow from the northwest pretty constantly during the dry season, cold and dry, pass Santa Cruz Point, flowing in a strong current across the bay and up the Salinas Valley. The timber covered mountains on the northerly side break and temper the wind force, whilst the strong current, passing a mile or two outside, produces an eddy, near the centre of which, during a large part of the time, stands the City of Santa Cruz.

This movement of the air currents along the coast has been noticed by Prof. Davidson, of the Coast Survey. When the northwest summer winds are blowing with considerable force, he has observed a counter land current, or a sort of eddying of the land breeze. The configuration of the coast on the northern side of the Bay of Monterey favors the production of a wide eddying air current, extending some 15 or 20 miles inland. So that what is not uncommon on a small scale along the coast, north and south of San Francisco, is magnified in the region about Santa Cruz. These eddies of air are always mild. They are usually warmed by the land and the sun, and favor largely the growth of vegetation. As a means to give regularity to these eddies, a gate or opening in the coast is necessary. For example: At San Francisco, the "Golden Gate" admits a large air current, which spreads out on the Bay of San Francisco, flowing off into the numerous valleys, and becoming equalized with the surrounding air in temperature and other qualities. This renders mildness to the climate of San Rafael, Berkeley, Oakland, etc., by the counter currents so modified.

A wider and more extensive opening exists on the southeastern coast of the Bay of Monterey—the Salinas Valley. This opening is about six miles wide and extends for one hundred miles back, offering but little obstruction to the inland flow of the strong air current which sweeps across the bay. No such gates exist for several hundred miles north of San Francisco; in fact, until the mouth of the Columbia is reached. And none south of the Bay of Monterey, to any great extent, until we approach the valley or plains of the Los Angeles; although an extensive air eddy is in the region of Santa Barbara, giving that place a very mild and genial climate; yet this does not depend on an opening in the coast range, but rather an a point of land projecting into the ocean current and breaking its force, thus causing a counter current on the margin of the main flow.

Attention is called to a map on an adjoining page, prepared to illustrate the wind currents of the Pacific Coast from April to October, and to show the points where the yearly and monthly temperature and rain-fall has been ascertained, as explained in tables accompanying this article. The scale of the map from north to south is much shortened, in order to bring the most important coast openings within a short space.

On the Pacific Coast, the ocean and air currents during the summer season, say from April to October, very nearly coincide. Prof. George Davidson says that "a southwest wind is extremely rare" during this part of the year, and that the prevailing currents of air and water are from the northwest. Ships sometimes make a long tack even to the 140th degree west longitude, where the currents are more northward. The wind current follows the trend of the coast, gradually drawing towards the land, passing through "wind gaps." The Professor confirms what I have already said in regard to counter currents on the land. He has noticed these when some 15 or 20 miles back on some high peak or mountain. When the wind blows down the coast, overlapping the land, and flowing over capes and promontories with a strong current, two or three miles inland the air is often calm and warm. Such is remarkably the case in the Santa Cruz Mountains. We may observe the white caps a mile or so out, whilst

standing on some high point, scarcely a couple of miles inland, we enjoy a very mild breeze.

The whole coast from Sitka to San Diego is mountain walled, having but comparatively few gates. Hence the currents are compressed, and forced with considerable rapidity along the coast southward. Opposite or above Santa Barbara they begin to bend westward, in the equatorial or return Japan current. A portion, however, pass toward and above the land, spreading out eastward from Los Angeles to San Diego. This wind, however, is mild and genial, and adds much to the pleasantness of the region bordering on the Santa Barbara and San Pedro channels. And were it not for occasional *siroccos*, that come from the deserts eastward, this would be the most favored region in the world as regards climate. North of Santa Barbara these desert winds are seldom felt—perhaps, never north of Monterey Bay.

FOGS.

Fogs are prevalent during the summer season in the line of the northwesterly air current. These fogs are the effect of a cold current slowly penetrating a warm current of air, or *vice versa*. The vapor contained in the warmer body of air is condensed, becoming clouds at or near the surface of the earth. The condensation of this vapor, giving out its heat, usually renders the fog mild in temperature and not unpleasant. This is especially the case where there are eddying currents. As soon as the temperature of the different bodies of air are equalized the fog disappears. As we pass southward from Cape Mendocino these fogs become milder especially as we recede from the main current of air which begins to spread wider as we approach the Bay of Monterey on account of the eastward trend of the Coast line, and the north equatorial current towards China and Japan. We may remember, as a rule, along the central Pacific Coast that places exposed to the northwest have more fog in the season of northwest winds than places open to the southward. And also that the rainfall is greater in the latter places than the former, because our rains come with the southerly winds. Of course this applies to places of nearly the same latitude, remembering that the rainfall decreases from north to south. (See meteorological table.) As an illustration of this rule the rainfall at San Francisco is 21.79 inches. It should be less at Santa Cruz and Watsonville because they are situated 50 miles south of San Francisco. But they stand with a southward exposure and consequently receive 22 to 23 inches. We should expect, if we had any way of measuring fog, that San Francisco and places of like exposure would receive proportionately a greater amount than the Santa Cruz region.

RAINFALL.

The rainfall along the Coast north of Monterey is always sufficient. Taking Santa Cruz as a representative central point we may say that so far as agriculture is concerned there is seldom a deficency injurious to vegetation. Together with the direct rainfall and the fogs there is always enough moisture to mature crops. The summits of the Santa Cruz mountains receive almost double the amount of rain that falls near the sea

This has been demonstrated at the Springvale Farm, the
f Mr. D. M. Locke, who has kept a record of the rainfall
last 3 or 4 years, showing a total each year of nearly
hat of Santa Cruz. Thus the Santa Cruz mountains
a reservoir for a large amount of water, a good part of which finds its way to the sea in small streams like the Aptos, Soquel, and San Lorenzo creeks. In fact almost every mile from the Pajaro to Pescadero is furnished with a perennial stream. The groves of redwoods and other trees by their dense root fibers hold this rainfall like sponges only giving out as it is required and drawn away by the surrounding dryness.

REDWOOD FORESTS.

It may be asked, if these groves of timber in these mountains should be cut away would not the region become as barren as the mountains north and south of them. I think not. The Redwood is especially hard to kill; for a score of young sprouts will immediately spring from the stump of a fallen tree, and the certainty of the rains would in a little time bring into existence a crop of trees to take the place of the fallen ones. Although the supply of timber is very great in these mountains it cannot be considered inexhaustible. The rapid increase of population and consequent demand for building material and fuel will in time lead to the denudation of the regions nearest the large cities. Consequently a preservative policy should be adopted at an early day by which a portion of the land should retain, at least, the younger growth for future use. It would indeed be a wise policy to enforce a law to this effect if it cannot be done otherwise. The general future good of our State requires it, and especially the places in and near the timbered lands.

SALUBRITY.

Temperature has much to do with our comfort and health. It is true that man may live in almost any climate on our globe by the aid of clothing, shelter, food, and other artificial helps. But it is certainly more pleasant and conducive to longevity to live in a climate where the minimum of such aids are necessary; —where it is not required to spend one half the year in preparations to keep from freezing and starving the other half. Neither is a tropical climate the best. It fosters indolence by an excess of heat, and need of an occasional cold and stimulating air. The tropical climates in addition are usually prolific in diseases. and the atmosphere is rare and humid, producing and favoring debility. North of Cape Mendocino the rainfall begins to be unpleasantly abundant, although the temperature is not unfavorable.

One would therefore prefer a climate medium in these respects. It should be warm enough and dry enough to require but little confinement indoors. There should be range enough in temperature to give variety, and not enough to shock the human system by sudden changes of heat or cold, humidity or dryness.

These are conditions generally agreed upon by the best authorities, not only for the well being of invalids suffering from the principal diseases that flesh is heir to, but for those in robust health that they may remain well. Any climate, therefore, characterized by sudden and violent changes of temperature, cold and humid; or even dry and irregular, with extremes of heat and cold, is not favorable to good health; especially is it conducive to diseases of the lungs. A climate where people must remain indoors a large portion of the time on account of its inclemency must engender disease.

It would seem then that so far as temperature is concerned, the central and southern region of the California Coast, when sheltered from the northwest winds and free from the *siroccos* of the east, within the flow of the mild eddying currents of air that have just arrived from the broad expanse of water and

been warmed by the sunshine and heat of the land, would be of all places the most healthful. In these localities the thermometer seldom rises above 80 deg., and rarely comes down to the freezing point. Out-door life is practicable at all seasons and almost every day in the year. Oppressive heat is seldom felt, and nothing colder than a slight frost during the coldest mornings of winter. During all the summer months, from April to November, there is a steady temperature of air a few miles out from the land. At the Farallones, 42° is the constant summer standard—(the mean annual temperature of Sitka nearly 20° further north.) This is cold,—especially when accompanied, as it nearly always is, with a strong wind. But near the coast the water and air are rapidly modified, as is illustrated by the following table, for which I am indebted to the Rev. Dr. Willey of Santa Cruz, at least for the Santa Cruz observation. I have added for comparison the water temperature at a place on the Atlantic Coast near Newport, R. I., taken by Capt. R. J. Edwards; and also the air and water temperature at Santa Monica, Los Angeles County. All these observations were made in the year 1876.

1876.	Jan.....	Feb.....	March..	April...	May.....	June....	July....	Aug.....	Sept....	Oct.....	Nov.....	Dec.....
SANTA CRUZ.												
Air.....	54.4	54.9	52.2	58.6	59.2	60.2	61.8	63.0	61.3	59.4	52.8	55.2
Water.....	52.1	52.7	52.2	57.2	57.2	58.2	60.4	60.2	60.0	56.3	54.7	53.3
SANTA MONICA.												
Air.....	....	....	....	....	....	68.0	68.0	65.5	65.2	....	....	....
Water.....	....	....	....	....	....	69.0	69.5	68.0	65.5	....	....	....
NEWPORT, R. I.												
Water.....	32 0	30.7	34.4	43.0	52.5	61.7	69.5	70.4	65.3	58.3	43.7	36.2

The observations for Santa Cruz and Newport were taken at from 9 to 11 o'clock A. M., in water 8 to 10 feet deep. The air temperature was taken in the shade of the powder mill wharf, just over the water. At Santa Cruz, sea-bathing is not uncommon in the winter season, and the temperature quite endurable. At Santa Monica the water temperature of the four summer months seems to stand above air temperature. The water where the temperature was taken must have been distant from the ocean currents, to attain such a high degree of heat, or else the figures have been reversed. I find them in the Fourth Report of the State Board of Health, of California.

SEA BATHING.

The general experience is that water at a temperature between 70 and 90 degrees is, for bathing purposes, rather too relaxing in its effect. It does not bring about a tonic and stimulating feeling so necessary to secure the benefit of a sea bath. When invalids and persons of rather feeble constitutions can gradually become accustomed to the lower temperatures in the open warm air, say 50 to 60 degrees water, and 70 to 80 degrees air, they are invigorated. The experiments should at first, however, be carefully made, so as not to bring about injurious congestions of the internal organs. Only a few minutes' time in the water, then allowing the blood to return to the surface. Otherwise, such persons would do better to use the hot bath, 95 to 105 degrees. But persons, young and of a robust constitution, may be still further strengthened by even the winter sea bathing, which is often enjoyed in Santa Cruz.

HUMIDITY.

A word in regard to humidity. In this respect the coast region is very accommodating. Humidity is not indicated by the rain-fall. It is the amount of watery vapor contained in the air. This can be measured pretty well with the wet and dry bulb thermometers. At the beach, and near the surface of the water, the air is almost or quite full of watery vapor at nearly all times. As we recede from the shore toward the summits of the mountains, the air becomes dryer. We may find almost any degree of humidity required within 15 or 20 miles of the coast.

MALARIA.

There is very little malaria. Possibly in some of the mountain and forest closed basins, during the latter part of Autumn, malaria may be generated. But generally the air is pure, because these valleys are regularly *swept*, almost every day, by the sea breeze, coming with its *ozone* as a disinfectant. The sweeping is so gentle that the inhabitants are not disturbed, and yet poisonous gases are dispersed.

BOTANY OF SANTA CRUZ AND VICINITY.

Aside from rain-gauges, hygrometers, thermometers and such things, all useful in their way, and helps to a correct knowledge of climate, we have a single and more certain test. It can be read and applied at a glance. It is the *flora* of a country. If we know the plants, we may be able to describe the climate. The botany of the Santa Cruz region tells, with peculiar emphasis, the qualities of the climate.

The number of plants is so great that to make a full catalogue of them would only be of interest to the professional botanist. I shall not attempt much more than a general description, except to give a list of the trees. They will indicate somewhat the character of the smaller plants. They will also indicate to the horticulturist the kind of plants that may be successfully grown here for fruit, ornament or other uses.

FOREST TREES OF SANTA CRUZ COUNTY.

This county is rich in the abundance and quality of the native forest trees. In making this list, it has been a question sometimes where to draw the line between trees and shrubs. Some of what might be called shrubs in less-favored climates, grow to be trees here. There is quite a list of shrubs not included in this list, but several shrubs, properly so called, will be found here.

BUCKTHORN FAMILY.

RHAMMUS CALIFORNICA—Alder Buckthorn.—Ten to twenty feet high, forming thickets; wood soft, like Alder. The fruit contains a seed like the coffee grain, hence is called "Wild Coffee," and the seeds have been used as coffee, but the plant is quite distinct from the Coffee plant.

CEANOTHUS THYRSIFLORUS—California Lilac.—Six to eighteen feet high; borders of forest; wood hard, makes good fuel; flowers fragrant and handsome.

C. PAPILLOSUS.—Resembles the last; not quite as large; 6 to 10 feet high.

C. INCANUS.—Hardly a tree, but a large, straggling shrub along creeks.

C. CRASSIFOLIUS.—Six to twelve feet high.

STAFF-TREE FAMILY.

EUONYMUS OCCIDENTALIS — Spindle Tree.—Eight to fifteen feet high; not abundant.

MAPLE FAMILY.

ÆSCULUS CALIFORNICA—Buckeye, Horse Chestnut.—Ten to thirty feet high. A really handsome and ornamental tree when properly trained.

ACER MACROPHYLLUM—Big Leaved Maple.—Fifty to ninety feet high; somewhat abundant; wood soft but valuable.

NEGUNDO CALIFORNICUM—Box Elder.—Fifty to sixty feet high; abundant.

SUMAC FAMILY.

RHUS DIVERSILOBA—Poison Oak.—From a small shrub, three or four feet high, to quite a tree, 20 to 30 feet high, and six inches in diameter. A great pest on account of its poisonous qualities.

PULSE FAMILY.

LUPINUS ARBOREUS—Tree Lupine.—Four to ten feet high, with a variety of fragrant flowers.

ROSE FAMILY.

PRUNUS ILICIFOLIA—Wild Cherry.—An evergreen, 15 to 40 feet high.

NUTTALLIA CERASIFORMIS—Oso Berry.—Two to fifteen feet high.

HETEROMELES ARBUTIFOLIA—Photinia.—Four to twenty feet high, with beauful red berries, ripening in December.

AMELANCHIER ALNIFOLIA—June or Service Berry.—Eight to twenty feet, on the San Lorenzo river; berries edible.

ADENOSTOMA FASCICULATUM—Chaparral, Chamiral.—Eight to twenty feet high.

CURRANT FAMILY.

RIBES SPECIOSUM—Wild Currant.—Six to ten feet high; has beautiful Fuchsia-like flowers.

R. SANGUINEUM.—Growing to be a small tree, 12 feet high; beautiful flowers.

DOGWOOD FAMILY.

CORNUS NUTTALLII.—A small tree, 20 feet high; resembles the "Flowering Dogwood" of the East, but more showy; northern part of county.

C. CALIFORNICA.—On stream banks; 10 to 15 feet high.

HONEYSUCKLE FAMILY.

SAMBUCUS GLAUCA—Elder.—Grows to be quite a tree, 10 to 30 feet high, and often a foot or two in diameter.

COMPOSITÆ FAMILY.

Of this very large family of plants, so abundantly represented in this county, only one or two assume anything like the proportions of a tree.

BIGELOVIA ARBORESCENS.—A shrub 4 to 8 feet high, but growing with the habit of a tree, on dry hills, with Pines and Manzanitas.

BACCHARIS PILULARIS—Groundsel Tree.—The California Botany says, "2 to 4 feet high," we have it 8 to 12 feet high.

HEATH FAMILY.

ARBUTUS MENZIESSII.—A handsome tree, called "Madrona" by the Spaniards, because it resembles the Strawberry Tree of the old world. One of our most attractive trees.

ARCTOSTAPHYLOS TOMENTOSA—Manzanita.—Six to twelve feet high; berries abundant, edible.

A. ANDERSONII.—A large tree, 10 to 15 feet high. So far only found in vicinity of "Big Tree Grove," by the author of this paper.

RHODODENDRON CALIFORNICUM.—The California Rhododendron is found in the northwestern part of the county; a beautiful shrub or small tree, 6 to 8 feet high.

R. OCCIDENTALE—Azalea.—Ten to fifteen feet high, flowering all the year, giving fragrance and beauty to the woods; everywhere about springs.

LAUREL FAMILY.

OREODAPHNE CALIFORNICA—Bay Tree or Mountain Laurel.—A valuable tree for cabinet and furniture work, 30 to 100 feet high, and one to three feet diameter. Beautiful for inside finish of houses.

MESEREUM FAMILY.

DIRCA PALUSTRIS—Leatherwood.—A bush 6 to 10 feet high; same as the Eastern species of Kentucky, Pennsylvania, and New England.

PLANE TREE FAMILY.

PLATANUS RACEMOSUS—Sycamore or Buttonwood.—In valleys bordering the coast; 50 to 100 feet high; wood valuable, receives a good polish; durable.

OAK FAMILY.

QUERCUS LOBATA—White Oak.—Differs from the Eastern "White Oak;" on open mountain spaces; timber useful; abundant; 50 to 70 feet high.

Q. AGRIFOLIA—Live Oak, Evergreen Oak.—Abundant; forming groves near the ocean; 30 to 90 feet high.

Q. DENSIFLORA—Chestnut Oak.—Very abundant; furnishes tan bark of the best quality.

Q. CRYSOLEPIS—Canyon Live Oak.—A valuable timber tree, with tough fibred growth; next to the Eastern White Oak; Ben Lomond and vicinity.

CASTANOPSIS CHRYSOPHYLLA—California Chestnut.—Generally shrubby, but sometimes 50 feet high. A variety called Pumila, shrubby, on sandy hillsides; Chincapin.

CORYLUS ROSTRATA—Hazelnut.—Eight to ten feet high, bearing abundance of nuts.

SWEET GALE FAMILY.

MYRICA CALIFORNICA—Bayberry or Wax Myrtle.—Moist places; 15 to 20 feet high; evergreen.

BIRCH FAMILY.

ALNUS VIRIDIS—Alder.—The charcoal of this tree is used extensively in powder manufacture.

WILLOW FAMILY.

SALIX BIGELOVII—Bigelow's Willow.—Ten to fifty feet high; common.

S. LASIANDRA—Shining Willow.—With preceding; 40 to 50 feet high.

S. LÆVIGATA—Smooth Willow.—With the preceding; a handsome tree, especially when in bloom; 20 to 40 feet high.

S. SITCHENSIS—Sitka Willow.—Has a beautiful silky leaf underneath; near the running streams; 10 to 15 feet high; generally reclining.

S. BRACHYSTCHAYS.—On hillsides, where the male plant lights up the borders of openings with white, woolly catkins, early in February; 8 to 20 feet high.

POPULUS MONILIFERA—Cottonwood, Poplar.—Large trees along the creeks; there are probably two or three species, as yet not fully decided.

PINE FAMILY.

PINUS INSIGNIS—Monterey Pine.—Sparingly in northern section; well known as the most common cultivated Pine; of rapid growth, reaching 60 feet high in a few years.

P. TUBERCULATA—Knotty Pine.—A handsome little Pine, 40 to 60 feet high, with symmetrical clusters of cones.

P. PONDEROSA—Yellow Pine.—High, sandy ridges; a valuable timber, reaching 100 feet in hight.

ABIES DOUGLASII—Douglas Spruce.—Next to the Redwood in size and value for lumber.

SEQUOIA SEMPERVIRENS — Redwood.—Sometimes reaching 300 feet in hight. Very abundant.

TORREYA CALIFORNICA—Nutmeg Tree.—A valuable timber. The nuts are not like the Nutmeg, except in appearance, outside. The meat is edible, but the squirrels usually get it; grows 50 to 80 feet high, and two or three feet in diameter.

TAXUS BREVIFOLIA—Western Yew.—Rare; 30 feet high. At Laguna Falls.

CUPRESSUS MACROCARPUS—Monterey Cypress.—Northern part of county; abundant; in cultivation as an ornamental tree; 30 to 50 feet high.

Other trees may be discovered. The recesses of valley and mountain have not all been explored, as yet, by the botanist, and it is likely many additions to the flora of this region will be made.

FLOWERING PLANTS.

The herbaceous flowering plants are so numerous that we can only speak briefly of the members of a few families.

The buttercups are represented by the *Ranunculus Californicus*, which, during the whole year, may be seen with its yellow flowers, in moist, grassy places. A *clematis* may be seen climbing over trees and bushes along our creeks. When the white, silky flowers are gone, the fruiting, with its long white tails (one to two inches), gives the trees over which it twines, a beautiful appearance during the winter months. We have the little "wind flower," *Anemone Nemorosa*, so much loved in the East. With us it grows larger, and none the less beautiful. The columbine, *Aquilegia truncata*, has a beauty not inferior to any of its relatives, and the larkspurs, of which there are four or five species, all perennial, have great beauty.

Of the barberries, we have three or four shrubby plants, all worthy members of that family. Some are used in medicine, and others have berries not unpleasant to eat.

The Poppy family is represented by three or four beautiful species, worthy of cultivation, the *Eschscholtzia* and two species of *Platystigma* being among them.

There are four species of beautiful violets, three in the woods and one in the fields.

Two species of "Spring Beauty," *Claytonia*, are found in abundance. Also a beautiful mallow flowering early in the spring in fields, quite attractive, and among the first spring flowers.

The lupines are numerous, and nearly all handsome—about ten species of the forty to fifty belonging to California. We have also a large proportion of the clovers—ten out of the twenty-six credited to California. Many of them are showy and singular in shape; besides, they furnish good forage for horses and cattle. We cannot say as much for the lupines. Wild peas abound, and cattle get fat on them in the mountain ranges.

Two wild roses, one in the woods, and the other on the open lands, are found. They are both very fragrant, both beautiful, but not as showy as cultivated roses.

Evening primroses, two or three members of the family, are well worth cultivation, especially *Zauschneria*, *Clarkia*, one or two species of *Œnothera* and *Godetia*.

Twining over trees and undergrowth, there is a vine somewhat like a cucumber. It is *Megarrhiza*, commonly known as "Big Root." It bears a fruit about the size of a peach, covered with prickles. Often the root is twelve to fifteen inches in diameter, and four or five feet long, whilst the vine may be fifty feet long.

Another vine, often found with the above, is a convolvulus *(C. occidentalis)*. It has white flowers, large and handsome.

Conspicuous along the shaded streams and moist hillsides, are several species of the "Monkey Flower," *Minulus Douglasii*, *M. lutens*, *M. moschatus* (the musk plant), and on dry grassy hills, the *M. glutinosus*. With the latter, and about moist cliffs, the *Collinsia bicolor* grows. This has a beautiful flower, and is often cultivated.

A BEAUTIFUL SCENE.

In March or April, in May or June, whenever we choose to look, there is a glow of bright colors on fields and hillsides. The air is perfumed with a pleasant fragrance. There is such a profusion of flowers, we cannot count them. The lupine, the orthocarpus, grindelia, wyethia, erithichium, bæria and malvastrum, and others too numerous, but not unworthy to mention, mingle their colors and fragrance, and we stand enchanted in a field of beauty. Botanical names and terms are but luggage to worry and perplex. We forget it all, and only feel and know the charm that surrounds us.

Or if we go to the woods in the summer time, after the fields begin to brown with age and ripeness, and find some shady brook passing under the alders, the bay trees, the pines and the oaks, we shall enjoy the scene with no less fervor. Here are the ferns, a numerous family, the wood mosses and the lichens. Here are lilies, saxifrages, equisetae, orchids, sedges, holy grass and liverworts. The birds serenade us from the tree tops, and the brook sings a song of content as it goes joyfully towards the sea. We will not try to entice the trout from their native element, because they are more beautiful there than in our fish basket. Let us fill the latter with treasures of the floral kingdom for our home decorations.

With the first rain, usually in October, plant life starts anew, or, rather, the old are refreshed, and flower buds, checked by the dry weather, burst and come into bloom. Grass springs up, and the hills begin to be green. It is rather the waking up from a long summer sleep, for not until the first of February, can we say that spring really begins. Then the *new* buds begin to swell and open with the warm days and the bountiful rains that have fallen.

SEA MOSSES.

But if we choose a different scene, we may find it in all its strangeness, on our beaches at low tide. There we shall, at all seasons, find abundance of sea plants—the algæ. The coast from Aptos to Pescadero, abounds in the greatest variety of "sea moss" and other marine plants. First of organic forms these grew in the sea, when there was no place for the flora of the land. These are the pioneers of the vegetable kingdom, the first-born of creation. They deserve our especial and particular attention, not only for the beauty that many species possess, but as coming more directly from the Creative hand, in that day when the waters were commanded "to bring forth abundantly."

INFLUENCE OF CLIMATE ON PULMONARY AND OTHER DISEASES.

It may be well to say a few words additional in regard to the influence of climate on pulmonary and other diseases, tending towards consumption. There are certain conditions of climate where the physician can do but little good, owing to relapses from climatic causes. And with each relapse the hope of recovery becomes less. A change should be made early to a climate, the first requisite of which should be pure air. Temperature, elevation and humidity should next be taken into the account, according to the requirements of the case.

For a long time the southern part of France has had a reputation as a favorable resort for consumptive patients. The little town of Cannes, and other places bordering on the Mediterranean, where a row of hills rises within a short distance of the sea side, there have been erected at various altitudes, villas and hotels, to accommodate the numerous persons who resort there for recuperation from disease. Many cases have been cured, and in others the disease has been stayed by moving up into these hills. Those who are suffering with pulmonic fever, obtain almost certain relief by moving from 300 to 500 feet higher than where they may be living. This benefit comes, not only to those suffering with consumption, but as a rule to all cases of disease accompanied by a quick pulse, high temperature, debility, and deficient state of nutrition.

Northward of the bay of Monterey, the elevations rise gradually with terraces and plateaus, so that almost any desirable elevation up to nearly 4,000 feet, can be obtained within a distance of ten or fifteen miles.

SANTA CRUZ FOR HOMES AND HEALTH.

Furthermore, invalids must have some physical and mental employment to the extent of their strength. In this region there is ample scope. Within a comparatively small area, there presents a great variety of resources. And the person who will not make an effort by some active pursuit, to overcome all physical debility, is beyond the help of this or any other climate. These mountains, brooks, forests and fields, the hidden, unexplored and undeveloped wealth, the sea shore, with its exhilarating air and bathing facilities; mineral springs of undoubted good

qualities, tried and untried; scenery that in all its beauty of earth, sky and water, is unsurpassed; all these, and many more, must stimulate and inspire the most despondent with fresh and bright ideas of life, and a resolution to overcome and break the fetters caused by disease.

Stock and fruit raising, manufacturing and utilizing the abundant natural resources of this region, would give employment to a very large population. And any taste, disposition or skill persons might have, would find congenial openings for their use.

I do not speak of this region as a place only for invalids, as a place for summer or winter resort. Although in many cases, invalids may be benefited by a short sojourn here. But it is a place to make a permanent home—to recover health and to retain it. There are many persons who have accumulated fortunes in other lands—perhaps at the expense of health. Disabled in that respect, they cannot enjoy their homes. A change of climate becomes necessary. A few weeks or months might do good, but a permanent change in many cases must be determined upon. There are many places with sunshine and a genial climate. But these alone are not all that is needed. Employment and contentment generally mean the same thing, and good health is often their attendant.

Persons with ordinary intelligence, to guide willing and industrious hands, with or without capital. would scarcely fail to find somewhere in the region I have thus imperfectly outlined, remunerative investments, bodily restoration, if needed, and most assuredly comfortable and happy homes.

GEOLOGY OF SANTA CRUZ COUNTY.

The Santa Cruz range of mountains may be said to extend from the Golden Gate to the bay of Monterey and the Pajaro Valley. It lies between the Santa Clara Valley and the Pacific Ocean. It has an average width of 25 miles, including foothills, and a length of about 80 miles. There are many places 1,500 feet above the sea level—some points 2,500 to 3,000 feet. The Loma Prieta rises to 3,790 feet. This point (sometimes called Mt. Bache, for Prof. A. D. Bache, late Superintendent of the Coast Survey), lies nearly northeast from the city of Santa Cruz, about 15 miles by an air line, and nearly south from San José almost an equal distance.

The map accompanying this article, shows a section of the Santa Cruz range, as it would appear if all the groups of formations were present at one place in their natural order. But this seldom occurs. These formations are very much broken and disturbed, presenting a great variety of structures.

1. *Soil and Alluvium.*—As might be predicted from the rocks and vegetation of which this is the *debris*, this formation is exceedingly rich for agricultural uses. It is present, and covers almost the entire surface of this region. The higher hills and valleys are not deficient, as a general rule, in depth of soil, and in some of the many little basins it reaches a depth of 15 to 30 feet, deep enough to hold and support groves of immense trees.

2. *Conglomerate.*—This is a deposit of boulders, shale, clay, sand, and fragments of all the lower strata, worn and loosely cemented with calcareous matter. It was deposited when most of these mountains were under water. We find in it evidence of floods and washings of the sea. The fossils are fragments of wood, bones, mostly of marine animals shells of mussels and *other mollusks, turtles, such as we find now in our creeks, with* occasional impressions of sea weeds. It has no regular thickness. Sometimes found piled up against the shale in deposits 30 to 40 feet thick.

3. *Bituminous Shale.*—This is the "chalk rock." It varies from a white to a dark color, from a very fine to a coarse texture, and from a softness that crumbles between the fingers, to a flinty hardness that withstands the hardest steel. In it are tree-like concretions of very hard sandstone, 50 to 100 feet in length. In this we find bones of marine monsters, such as whales and seals. Occasionally there are beds of lignite, an impure kind of coal, three or four feet thick. Some of this coal is of good quality, and may prove valuable some day. We find small smooth pebbles, beds of shells and other remains of animals and plants, all marine as far as our discoveries extend. In the white and gray chalky beds we find microscopic remains of diatoms, sponges and other organic structures. In fact, most of this formation is the debris of these microscopic beings. Also, we find asphaltum oozing from minute crevices, especially in the flinty shale. This formation took place under the water at a time when the Santa Cruz range was near the level of the sea. Some places it is metamorphosed.

4. *Sandstone.*—This differs but little from the shale, except in the quantity of sand contained therein. It is not very firmly cemented, and mixes more or less with the shale in alternating layers, The fossils are pretty much the same as those in the shale. Many places to a large extent, it is saturated with petroleum, which seems to enter by capillary attraction from springs, the source of which remains a mystery. These deposits have been worked for petroleum without much success, but will doubtless some day become available for some useful purpose. There are works at present being constructed for collecting petroleum, with reasonable prospects of success.

5. *Limestone.*—This formation is more or less metamorphic, and the rock is crystalline. For economical purposes, the lime is of the very best quality, and when properly selected, serves as an excellent building material, and is easily worked. In quantity it is amply sufficient for all the demands of future ages. In places there are *caves* of considerable and unexplored extent. No fossils, except on the eastern side about New Almaden, as far as I know, have been found in it, yet it is possible that some exist in other places, and may be discovered. It is not in distinct horizontal strata, but generally in masses, as though it had been thrown into heaps when in a semi-plastic state, by the upheaval of the underlying formations. It gradually runs into the metamorphic on which it is superimposed.

6. *Metamorphic.*—This formation is of varied composition. Originally stratified, it is now broken and thrown into endless confusion. There are alternations of granite, quartz, slates, limestone, gneiss, etc. It is the most prevalent rock of these mountains, cropping out and occupying a large portion of the area. It contains iron, gold, copper, quicksilver, and probably, in places serves as basins for holding petroleum. I apprehend that the real economic value of this formation in these mountains is but little appreciated or known as yet, not having received that study and investigation it seems to require.

7. *Granite.*—Only in a few places have we discovered a strictly granite formation, or what might be termed a formation distinctly igneous in its origin. Even the granite that we find in these mountains, has probably at some period been stratified, although nearly all traces of stratification have been lost.

In the northern part of the range, but south of Pescadero Creek, there is a ridge of granite running nearly parallel with the coast, and some four to six miles back. Where it is exposed it crumbles readily, being disintegrated by exposure to water and winds for many centuries.

GENERAL REMARKS ON GEOLOGY.

The age of this range of mountains belongs to the Pliocene and Miocene Tertiary, as indicated by the fossils, some forty or fifty per cent. of which belong to species now living in the adjacent waters. On the ocean side the formation is more recent than on the northern and eastern slope. There the age gradually approaches the Cretaceous period, which is well marked in the Mount Diablo range further east.

The richest quicksilver deposits perhaps in the world, lies on the eastern slope of these mountains.

THE RUINS.

The "Ruins," so called, on Mr. D. M. Locke's ranche, six miles north of Santa Cruz, are in the sandstone (No. 4). The columns, that look somewhat like the ruins of an ancient city, are composed of sandstone cemented into rings three or four feet in diameter, and these rings lie one on the other, forming variously sized vertical shafts with capitals. The nucleii on which the sand formed into these fantastic shapes, are numerous fossils, fragments of echinoderms (a star fish), which furnished the lime for the cement. Similar formations may be seen along the beach where the sandstone has been formed into chimneys, the nucleus being a whale bone or bone of a seal.

MINERAL SPRINGS.

At some places there exist what are called "magnetic springs." There is one about six miles northeast from Santa Cruz, owned by Mr. Haight. It is quite a resort for invalids and pleasure seekers, and the water seems to possess medicinal qualities of a kind favorable to health. The water is cold, has a pleasant softness, and agreeable taste. Iron is rendered magnetic by immersion in the water for a short time. It is supposed to get its magnetic quality from passing over magnetic iron ore in the metamorphic rocks.

There are, as one might suppose, from the geological character of these mountains, a large number of *mineral springs*, all possessing more or less good medicinal qualities, according to proper judgment in their use. Pacific Congress Springs, ten miles southwest from Santa Clara, has a wide and favorable reputation. It is tonic and aperient, containing carbonates of iron and soda in large quantities.

The Aptos mineral water, flowing out of the shale near the coast, on Mr. B. C. Nichols' place, is of a peculiar composition. It contains large quantities of the sulphates of magnesia, lime, soda, the persulphate of iron, a small quantity of common salt, and considerable silica. One gallon contains about 185 grains of these materials. It has been found useful in diphtheritic and kidney affections, and might with proper judgment in its use, prove a valuable chalybeate.

There is also a "sulphur spring" on the headwaters of the Soquel Creek, owned by Mr. F. A. Hihn, which has a local reputation for the cure of rheumatism.

LIME, CLAY, CEMENT, ETC.

We find at various places a remarkably pure and white deposit of *sand*, which may prove valuable some day in the manufacture of glass. There is also a *black sand* along the beach, containing a small quantity of gold. In some instances, washing and extracting this gold has been profitable. In the vicinity of Felton are deposits of *moulding sand* used in foundries for castings. *Brick clay* is abundant in many localities.

In the foot-hills near Santa Cruz are extensive lime deposits, of the Post Tertiary age, which proves to be a valuable material in the manufacture of *hydraulic cement*. Works have been built at Santa Cruz at a considerable cost, to work this material. After many experiments, the prospects are fair for success in this enterprise.

Thus I have enumerated some of the resources of this region, north of the bay of Monterey, and to incidentally hint at their employment and development. A country so richly endowed with plants, soils, minerals, waters, climate and scenery, must be unusually attractive. And whether a person is sick or well, rich or poor, there are strong inducements to seek a spot hereabouts suitable to taste and conditions, and make that place a home.

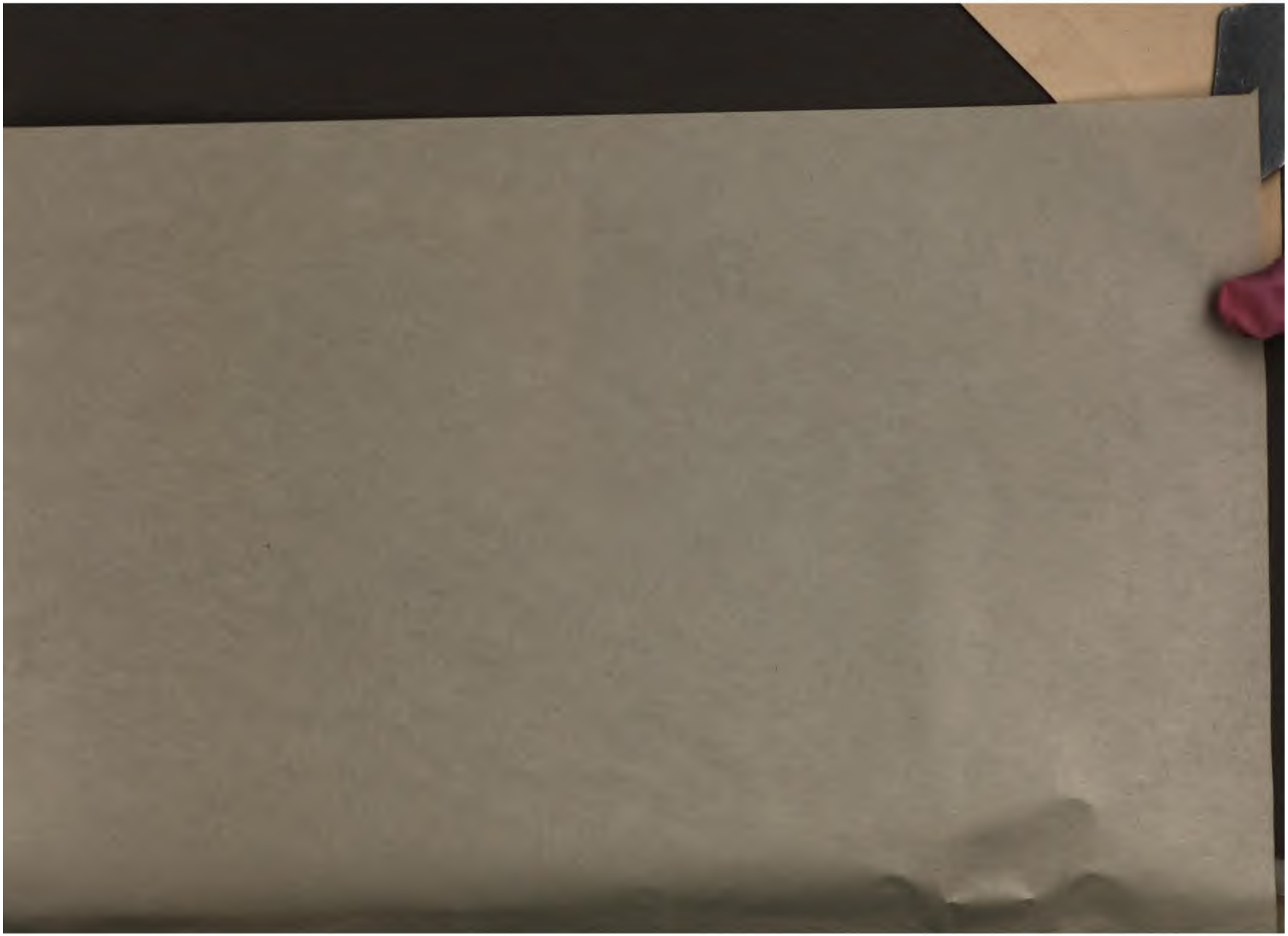
The following table, compiled from the reports of the State Board of Health, will show the mortality in twelve of the principal cities and towns of California, having a population of 3,000 and over. The record is for 1874, a year of average health throughout the State, except San Jose, which is for 1870–71—twelve months—as no record for 1874 was within my reach:—

CITIES.	Population.	Deaths per 1,000.
San Francisco	200,000	20.14
Sacramento	21,600	14.90
Oakland	20,000	12.65
Los Angeles	15,000	21.60
Stockton	12,000	11.30
Marysvile	5,000	23.60
Santa Barbara	5,000	24.00
Petaluma	4,500	12.60
Napa City	5,000	10.40
San Jose	10,000	21.20
Redwood City	3,000	15.60
Santa Cruz	3,500	8.50
Total Mean		16.37

By comparison with other years, I find that the results would scarcely be changed from those given, were it possible to present the average for a large number of years. The table shows Santa Cruz as a place favorable for health, having the lowest per cent. of mortality. It also shows Santa Barbara with the highest per cent., but not necessarily unhealthy, because it is the chief resort for invalids in perhaps, the last stages of consumption, and other diseases that no climate can cure, and dying there, have been included in her mortality list.

Whilst the mean annual mortality of fourteen eastern cities of the United States, is set at 25 per 1,000 inhabitants, the mean of these twelve cities and towns of California, representing a city population of over 300,000 persons, is only 16 to 1,000 population.

Of course the mortality of large cities is much greater than that of towns and rural districts. In Great Britain the average of 21 large cities is 25 in 1,000, whilst the average of the country population hardly exceeds 12, and in many localities will go much lower, even down to 8 or 7. The average of town, city and country of the eastern United States, or what is called the "normal death rate" is fixed at 17. The limit of deaths, considered unavoidable by statisticians, is fixed at 11 to 1,000. All above this they hold to be preventable in healthy countries. But thislimit of healthfulness is seldom reached. City mortality when under 20 shows a high standard of health; but when it reaches 30 and as it does some years, owing to epidemics, the degree is alar



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